

Preliminary Drainage Report Summary – Duluth Public Schools Academy (DPSA) 8-12

DPSA is in the process of completing a design for a new high school on newly acquired property along Rice Lake Road. The existing property was home to Snoflake Nordic Ski Center with an extensive trail system, a chalet and a few storage buildings. Almost the entire site is wooded minus the areas used for skiing. The proposed location of the high school will be in the south west corner of the property east of the Arrowhead Tennis Center.

Existing Site Drainage Conditions

The proposed site layout sits on multiple lots. The future property line to accommodate the new school will be approximately 21.34 acres. This will act as our project area when comparing existing to proposed. On the existing site there is only 26,455 SF of impervious or 0.61 acres. As stated above, a vast majority of the site is wooded aside from the areas that have been cleared of trees for the cross country ski activities. All runoff from the site flows south towards Rice Lake Road. Topography across the site varies from steep hillsides to flat areas including wetlands. On the site there are multiple wetlands that collect runoff and allow it a place to collect. All flow from the wetlands continues south to the ditch along Rice Lake Road. Once it crosses Rice Lake road through various culverts, it reaches a tributary of Chester Creek and is carried to Lake Superior.

Post-Construction Site Drainage Conditions

The post-construction site will consist of new school building, various parking lots, track/field surface and (2) smaller structures to service the field venue. The topography of the site will change leaving the parking and building on a level area constructed on the hillside. The post construction site will have approximately 9.91 acres of impervious, which adds 9.31 acres of impervious area.

The site and storm water design will be designed to meet the requirements of the City of Duluth UDC and Engineering Guidelines. Prior to the issuance of building permits, an MS4 Statement of Compliance will be issued when the storm water management plan is approved. The system will include discharge, sediment reduction and volume controls. The storm water conveyance and treatment system will be owned and operated privately. The Certificate of Occupancy will be issued after the as-built for the storm water management BMPs has been delivered to the City. The owner will be required to maintain the system to ensure it is functioning properly and correct all deficiencies should there be any.

The site will be treated extensively, because of the nature of the existing site. With much of the existing site being wooded and wetlands, the addition of 9+ impervious acres will produce a significant increase on the amount of site runoff. Substantial reductions in the time of concentrations are anticipated and will be accounted for in the design. The site runoff, especially from the parking lots and buildings, will be collected by various inlets across the site and piped to underground storage systems. Any runoff that flows toward the track will be collected in a perimeter underdrain section. Rainfall directly on the track and field surface will be collected in underdrains beneath the turf surface. All the underdrains will then be collected and discharged.

As shown on the attached sketch, there will be three main treatment areas based on the preliminary grading of the site. These systems will be one of three options:

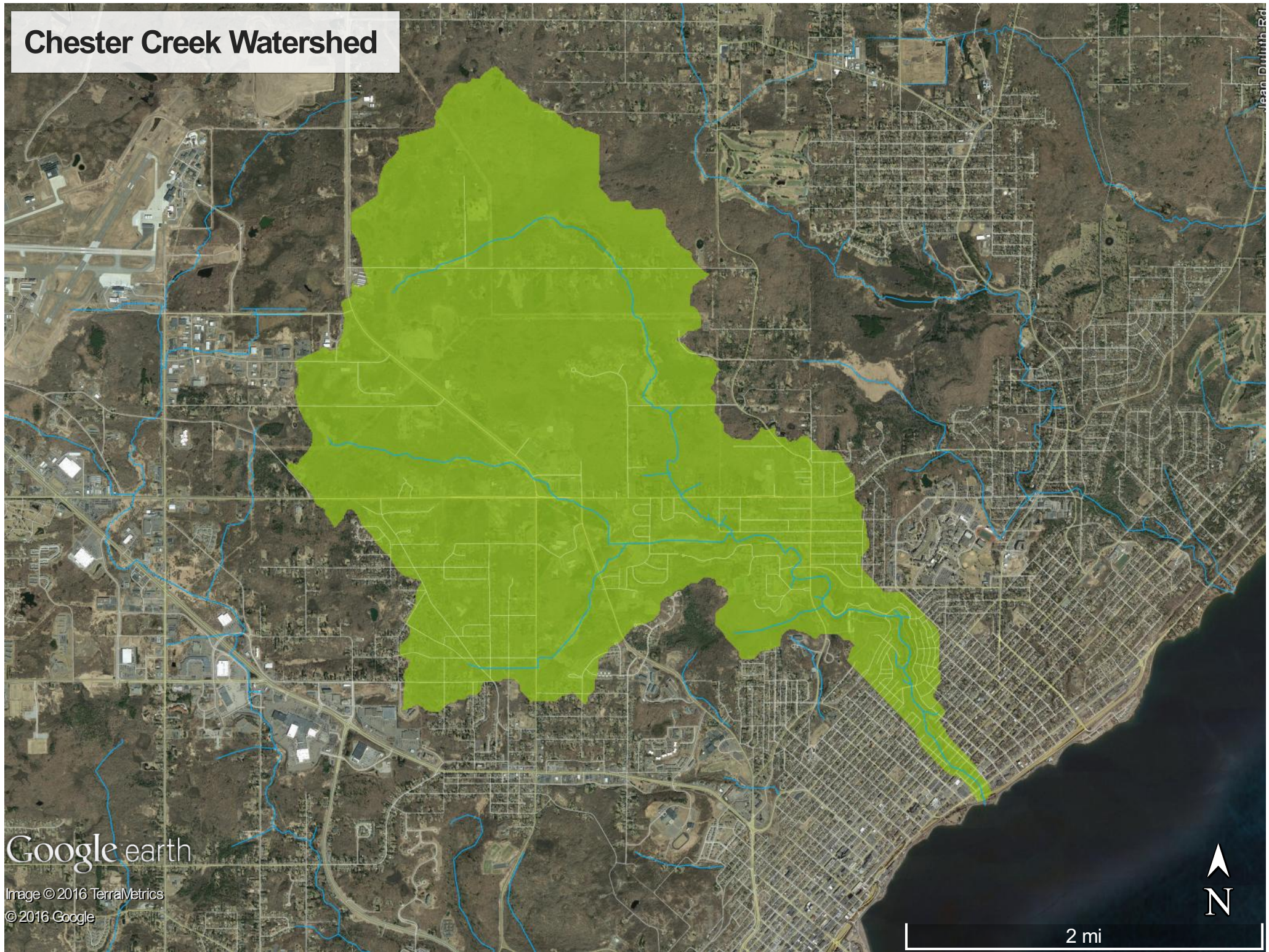
- 1) Large diameter CMP pipes with sediment treatment chambers preceding the entry to the system.
- 2) A porous media to double as storage and sediment treatment.
- 3) Combination of both of these systems.

Discharging to wetlands and sensitive trout stream environments, such as Chester Creek, require additional consideration for temperature controls. By treating and attenuating the site runoff underground, it will have a chance to cool before being released downstream.

All runoff from the post construction site will continue to flow into the same Chester Creek tributary on the south side of Rice Lake Rd. The runoff rates will be reduced and the sediment will be removed to the levels required within the UDC. Once in Chester Creek it will flow downstream and discharge into Lake Superior.

	Pre-Development		Post-Development	
	Area (SF)	% of Total Site	Area (SF)	% of Total Site
Total Site Area	929,446	100%	929,446	100%
Impervious Area	26,455	3%	432,028	46%
Pervious Area	902,991	97%	497,418	54%

Chester Creek Watershed



Google earth

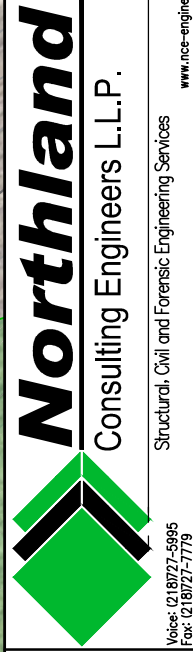
Image © 2016 TerraMetrics
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IMPERVIOUS AREA: 26,455 SF OR 0.61 ACRES



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DULUTH, MN

SCHOOL SITE

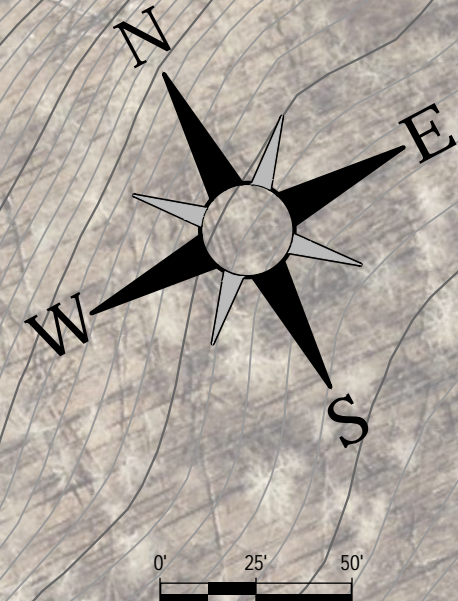
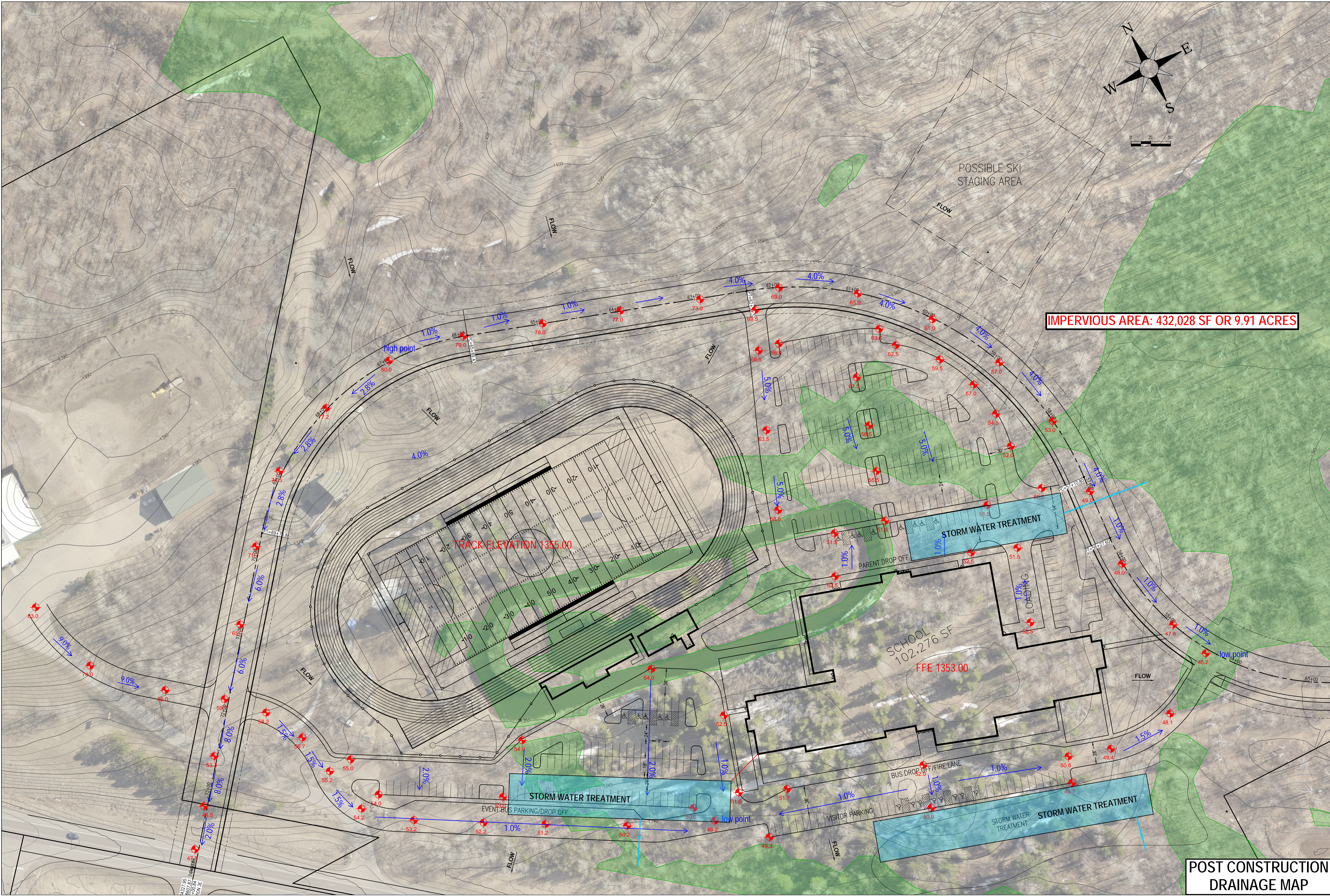
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
PRELIMINARY
NOT FOR CONSTRUCTION
Engineer: David C. Boif
Lic. No: 40926

Revision no.
Description
Proj #: 15-504-C
Date: 01/26/2016
Drawn By: ARZ
Checked By: DCB

SCHOOL SITE

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EXISTING
DRAINAGE MAP



IMPERVIOUS AREA: 432,028 SF OR 9.91 ACRES

POST CONSTRUCTION
DRAINAGE MAP

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DULUTH, MN

SCHOOL SITE

1511
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
PRELIMINARY
NOT FOR CONSTRUCTION
Engineer: David C. Boif
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1512
Project # 15-004-C
Date: 01/26/2016
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